

STEREO MOC Status Report  
Time Period: 2016:235 - 2016:241

STEREO Ahead (STA) Status:

1. The following Ground System anomalies/events occurred during this reporting period:

- On day 238, the DSS-14 support was deleted to support the Behind observatory recovery. This did not impact science data return.
- On day 238, during the DSS-35 support, telemetry lock was lost at 239-0427z and remained off for the last 8 minutes of the support. This anomaly resulted in the loss of 3 to 11 of SSR data and 8 minutes of real-time telemetry and tracking data. A DR has been requested.
- On day 240, during the DSS-25 support, turbo decoder lock was lost briefly at 2031z, 2049z and 2055z. These anomalies resulted in the loss of 3 frames of SSR data.
- On day 241, during the DSS-55 support, turbo decoder lock was lost intermittently between 1119z and 1138z. This anomaly resulted in the loss of 257 frames of real-time telemetry and SSR data. See DR# N110377 for more information.
- On day 241, during the DSS-26 support, turbo decoder lock was lost briefly at 2019z. This anomaly resulted in the loss of 1 frame of SSR data.
- On day 241, during the DSS-34 support, turbo decoder lock was lost briefly at 242-0004z. This anomaly resulted in the loss of 1 frame of SSR data.

2. The following spacecraft/instrument events occurred during this week. The Ahead observatory operated nominally during this week.

- The average daily science data return for Ahead was 6.4 Gbits during this week.

STEREO Behind (STB) Status:

1. The following Ground System anomalies/events occurred during this reporting period:

- None.

2. Behind Observatory Status - Unknown state of power, uncontrolled attitude, complex rotation (~14 minute rotation with the previous ~2 minute rotation) about the principal axis of inertia. Current orientation may support communication near the edge of the + Z LGA with some solar array input. Propulsion tanks are frozen. A spacecraft emergency remains in effect. Detailed status of the recovery activities to restore operations from the Behind loss of communication anomaly, which occurred on October 1, 2014, are listed below.

- On day 235, a 3.2 hour DSS-43 support starting at 0205z was added to continue Behind recovery operations. The uplink best lock frequency was found to be in the range of 7188.881000 to 7188.884000 MHz, which corresponds to a transponder baseplate temperature of -23 to -17.5 deg C. The carrier signal fluctuated over a 109 second period from -158 dBm to -167 dBm. The TWTA high voltage was powered off by the first command sent at 0425z after being on for approximately 6 hours.
- On day 235, a 4.4 hour DSS-14 support starting at 1900z was added to continue Behind recovery operations. The first command powered on the TWTA at 1941z. The EA mode bypass discrete was reinforced as well as ensuring that all heaters, IMUs, HGARA, star tracker, and reaction wheels were off. The carrier signal fluctuated over a 109 second period from -161 dBm to -169 dBm. The TWTA high voltage was powered off by the first command sent at 2300z after being on for approximately 3.3 hours. The DSN verified no data modulation using carrier and subcarrier FFT.
- On day 236, a 3 hour DSS-14 support starting at 1545z was added to continue Behind recovery operations. The first command powered on the TWTA at 1629z. The carrier signal fluctuated over a 109 second period from -162 dBm to -172 dBm. The TWTA high voltage was powered off by the first command sent at 1840z after being on for approximately 2.2 hours.

- On day 237, a 3 hour DSS-63 support starting at 1325z was added to continue Behind recovery operations. The first command powered on the TWTA at 1335z. The carrier signal fluctuated over a 109 second period from -160 dBm to -170 dBm. The TWTA high voltage was powered off by the first command sent at 1523z after being on for approximately 1.8 hours. The spin axis is estimated to be 12 to 14 degrees from the Earth-Sun line to the spacecraft. Due to the 22 degree/year mean drift rate, the current geometry which provides solar input and continuous RF communications will not occur again till 2022. A separate analysis using the Doppler shift data was conducted by the RF lead and the FDF which was in close agreement with the G&C observations. It was concluded that the solar arrays are generating ~250W at this time.
- On day 238, a 3.7 hour DSS-14 support starting at 1530z was transferred from STEREO Ahead to continue Behind recovery operations. The first command powered on the TWTA at 1538z. Selected power switching boards were powered off to prevent unwanted loading in preparations for powering on the IEM (avionics). This was successfully tested by sending the command to power off the board that contains the TWTA. After the TWTA powered off, the secondary propulsion tank heaters were powered on. The carrier signal fluctuated over a 109 second period from -162 dBm to -172 dBm. The TWTA high voltage was powered off by the first command sent at 1523z after being on for approximately 2 hours.
- On day 239, a 4 hour DSS-14 support starting at 1305z was added to continue Behind recovery operations. The secondary propulsion tank heaters were powered and the first command powered on the TWTA at 1322z. After the TWTA powered off, the primary and secondary propulsion tank heaters were powered on. The carrier signal fluctuated over a 109 second period from -161 dBm to -171 dBm. The TWTA high voltage was powered off by the first command sent at 1504z after being on for approximately 1.5 hours.
- On day 239, a 4 hour DSS-43 support starting at 2050z was added to continue Behind recovery operations. After powering off both propulsion heaters, the IEM (avionics) were powered on. The downlink signal began dropping out periodically. From analysis of the Doppler residual data from the FDF, the rotation is more complex, there is an ~14 minute rotation with the previous ~2 minute rotation. This

appears to have shifted the spin axis from 10.5 deg to 22 deg. Three packets of critical telemetry were received. From this very limited data, as expected, the observatory is quite cold, with the battery at 30% state of charge and generating power to support ~150W. From the propulsion tank pressures, the tanks appear to be frozen, however, no propulsion temperature data was received. The Sun angle averaged ~ 60 degrees. As the main bus voltage was 24v and falling, the transmitter was powered off early. While early in recovery, 2 of 11 battery cells appear not to be functioning. Verified that the increased battery charge rate command to C/4 was received. From engineering team discussions, it was decided to power off the IEM and power on the secondary battery heater to allow the battery to recharge. The secondary propulsion tank heaters were also powered on to continue thawing of the hydrazine.

- On day 240, a 4 hour DSS-43 support starting at 2050z was added to continue Behind recovery operations. No downlink signal was received after repeated commanding the transmitter on. Battery recovery commands were sent for the last hour of the support. The FDF delivered an updated ephemeris for Behind, with a predicted error between 200 and 2200 km, which the DSN began using. In preparation for recovering attitude control, an autonomous momentum dump was simulated on the hardware simulator using only the Y & Z gyros (X gyro has failed in both IMU units). This was successful, however the subsequent commanded rotation, about the Sun-line to establish communication on an LGA, was slower than expected.
- On day 241, a 4 hour DSS-14 support starting at 1315z was added to continue Behind recovery operations. The DSN created a new acquisition sequence for only sweeping a 3 kHz range about the best lock frequency and sending commands for 3 minutes, then repeating the sweep and commanding. 297 commands were sent for battery state of charge recovery. No downlink signal was received, however, none was expected.
- On day 241, a 4 hour DSS-43 support starting at 2050z was added to continue Behind recovery operations. 297 commands were sent for battery state of charge recovery. No downlink signal was received, however, none was expected.